

Vietnam's emerging software industry:

Competitiveness, positioning, and strategy in a global market



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TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
INTRODUCTION	4
Why discuss competitiveness? <i>The scope of this report</i>	
PART I: ANALYSIS AND STRATEGY FOR SOFTWARE COMPANIES	5
Analysis for the firm	5
Defining the market: Domestic Vs. international market demand	6
<i>Where should the company focus its marketing efforts?</i>	
Defining the sector: Software Services vs Software Products	9
<i>How should the company focus its development efforts?</i>	
Strategies for the firm	11
The value of industry clusters	11
The Capability Maturity Model (CMM)	12
<i>Raising the standard and benchmarking with peers around the world</i>	
PART II: ANALYSIS AND STRATEGY FOR GOVERNMENT AND POLICY MAKERS:	15
Analysis for government and policy makers	15
A PEST/STEP analysis for Vietnam in the Software Sector	15
Vietnam's position Vs. competing countries in the software sector	17
Strategy for government and policy makers	18
Setting priorities – the big picture strategy	19
Creating a domestic market that logically connects to global trends	20
<i>Open source and free software as a strategic alternative</i>	
CONCLUSION	25

EXECUTIVE SUMMARY

The challenges facing the software sector in Vietnam are similar to those facing the sectors of many industries in Vietnam. As Vietnam continues the process of integration into the global economic community, companies must learn to compete against companies located in other countries in order to raise standards of living at home. In contrast to mature sectors with slower growth rates, the global software sector continues to grow rapidly and presents unique opportunities for Vietnam. However, participants in the industry must take decisive action and make strategic choices to set the stage for Vietnam's competitiveness for generations to come.

Private sector participants in the sector must evaluate their options and be conscious of the different challenges associated with development of software products and services and between targeting the domestic and international market. Strategic collaboration between firms to elevate process improvement, through programs such as the Capability Maturity Model (CMM) and through participation in a Software Process Improvement Network (SPIN) Chapter, may raise the competitiveness of the whole sector.

Government and policy makers have a role to play in changing macro-economic factors which affect the competitiveness of the sector. Furthermore, the public sector has numerous tools at its disposal to affect the competitiveness of the sector but must be careful to set the correct priorities. Developing the software sector for export could have lasting benefits in the sector. Finally, there are global technology and licensing trends in the sector, such as open source software development and free software, which could be embraced to create profoundly positive benefits for Vietnam

INTRODUCTION

Why discuss competitiveness?

The scope of this report

The headline of a recent news article in Vietnam News (October 3, 2002) read “Software industry not growing as hoped” and cited several statistics which indicated that growth has fallen short of expectations in the industry. While industry targets were set at US\$80-90 million for the domestic industry and US\$200 million for exports, only US\$21 million was achieved last year.¹ The article continues citing the statistic that FPT, Vietnam’s most visible development company, received top line revenues of only US\$3 million last year.

At a time when Vietnam has begun the process of integration into the global economic community, such reports can have the effect of either discouraging participation and development of the sector or in focusing the minds of industry stakeholders on solving challenges which prevent accelerated growth and development of the industry.

The bias of this report on the competitiveness of Vietnam’s software industry follows that of business theorists who believe that a nation’s wealth is principally of its own collective choosing. According to the writings of business strategist Michael Porter, “Location, natural resources and even military might are no longer decisive. Instead, how a nation and its citizens choose to organize and manage the economy, the institutions they put in place and the types of investments they individually and collectively choose to make will determine national prosperity.”

For Vietnam’s software industry to compete globally, it will need close collaboration from a number of organizations involved in the “industry cluster” including the IT companies, financial agencies, educational institutions, government agencies, and business and professional associations. These organizations will need to work closely together towards a creating common strategic vision and identifying ways to enhance cluster competitiveness.

Therefore, a discussion on competitiveness will help industry cluster stakeholder organizations focus attention on key issues and opportunities to overcome challenges inhibiting development of the sector.

The scope of this report is to provide an analysis on the Vietnamese software industry, and its position within the global market, and to outline some strategies for increasing competitiveness of the sector. The report is not intended to be a comprehensive analysis of every factor affecting competitiveness of the sector but instead to highlight how Vietnam can realistically benefit from the global trends and changes taking place in the

¹ Vietnam News, Thursday, October 3, 2002. Page 2. “Software industry not growing as hoped.”

software industry. There are two major audiences for this competitiveness discussion including:

A: Individual firms making decisions on how to position their companies for competitive advantage in the global market.

B: Policy makers, government officials, and other stakeholders seeking to create the right environment to increase Vietnam's competitive position.

It's important to address both audiences simultaneously to avoid risks associated with poor coordination. For example, if individual firms are pursuing non-competitive strategies, then the amount of government support and resources required to make the sector competitive will be exponentially greater than if firms are pursuing achievable and realistic strategies. Conversely, government policy can distort the competitive landscape and create artificial market signals that isolate the industry from the global trends and the international economic system.

The US Agency for International Development (USAID), in partnership with the Kenan Institute Asia, is committing resources to assist the software development clusters in Thailand and Vietnam with the goal of improving their competitiveness. Efforts are underway to improve quality through Capability Maturity Model (CMM) training and establishing a Software Process Improvement Network (SPIN) chapter in Vietnam. This competitiveness paper is to provide a framework for the Vietnamese software developers and the cluster participants from the private sector and the government to consider areas that need to be addressed to enhance competitiveness.

PART I: ANALYSIS AND STRATEGY FOR SOFTWARE COMPANIES

Analysis for the firm

For Vietnamese firms entering the software sector or for existing software companies making decisions on how to position and become competitive in the global market, they are both a consumer of the business environment in which they operate but also play a role in shaping it. Firm level decisions and strategy should be set with a realistic perspective of key issues and challenges.

In the software sector, the key issues for individual companies revolve around inter-related questions that each company must answer to determine how they intend to compete. These questions include:

1. Where should the company focus its marketing efforts, in the domestic or international market?
2. How should the company focus its development efforts, in software services or software products?

Defining the market: Domestic Vs. international market demand

Where should the company focus its marketing efforts?

The first key issue faced by Vietnamese companies is whether to focus on the domestic or international market. The answer to this question is a function of two main variables - the opportunity at hand and the resources an individual company has access to for pursuing the opportunity.

In terms of the opportunity at hand, consistent statistics are hard to attain but some sources estimate that the Vietnamese market for IT hardware and services was over US\$230 million in 2000. Of that total, local firms have about 35% of the software market which reached a total of US\$50 million in 2000 (estimated). Contrast this with the global IT services market (not hardware) expected to reach US\$400 billion in 2002. Of that total, the only practical segment for companies in countries such as Vietnam to target is offshore software outsourcing – which represents nearly US\$8 billion.

Therefore, in terms of magnitude, clearly the larger opportunity is in the international arena. However individuals firms must make a careful analysis to determine whether or not they have the resources to pursue such contracts. As prerequisites to entering the international market, firms must have quality control processes in place, a sufficient track record to attract international clients as well as the sales and marketing infrastructure to make their presence known among potential buyers. There are a number of Vietnamese companies that have opportunistically leveraged a close contact, Viet Kieu relatives, or a previous career to win contracts with significant and reputable international customers. However, there are fewer examples of companies that have converted such one-time advantages into sustainable advantages for their companies. Consider the following: Qualified sales and marketing representatives, a single office presence, and expenses may cost \$250,000 a year in a target market such as Japan or the United States. While such a marketing presence might be expected to generate USD\$1-3 million per year in revenue, there will likely be a time lag of at least one year before revenue starts to materialize, therefore causing the Vietnamese company to incur a loss on their investment. Given the fully loaded billing rates of \$10-12/hour in Vietnam and associated operating and overhead expenses, companies with greater than 75-100 employees may be the only ones capable of risking such losses to increase their market presence if they rely solely on internally generated funds and not outside investors. So in addition to client references and proven quality assurance mechanisms, a clear investment threshold exists for companies that might be interested in pursuing international customers.

Alternatively, for companies not of sufficient scale to realistically pursue the international market, the domestic market provides an opportunity. However, the challenges associated with the domestic market are of a different nature. Procurement processes are not transparent, payment by clients are often delayed and sometimes not forthcoming at all, and for companies that have developed their own software products - intellectual property infringement is rampant through widespread piracy. Such realities undercut the ability of companies to recoup their investment. While the financial threshold for participation in

the domestic market is lower, the opportunity is smaller and, according to many industry participants, the headaches associated with success in the market are much greater.

CASE: Adjusting to global changes: VietSoftware, a small software development company headquartered in Hanoi, was founded at the height of the internet bubble and successfully won outsourcing contracts with several U.S. based companies. When the U.S. technology market contracted, VietSoftware discovered that it did not have the U.S. sales and marketing presence required to continue receiving U.S. contracts and therefore, turned to the Vietnamese market as a stabilizing revenue source. After solidifying its local position, the company has subsequently turned its attention back toward the US market and successfully won contracts with large companies such as IBM.

Assessment for the future

Despite the challenges that have occurred to date, there are favorable trends which provide reasons for optimism for industry participants. In the domestic market, Vietnam has begun participating in IPR protection treaties and the government is expecting to increase procurement of software and IT services as they implement Master Plans and E-government initiatives. Such activities will increase domestic demand. More compelling, but only for companies that can take advantage of the opportunity, is the state of the international market against the backdrop of global trends.

The current international market against the backdrop of global trends

For many years, offshore software development was considered an experimental or fringe activity by many multinationals. However, it has quickly become considered a more mainstream practice and with cost cutting pressures increasing, the number of companies prepared to use offshore providers is expected to grow by 50% over the next several years. Existing companies utilizing offshore providers are expected to double their budgets allocated to offshore development in the same time frame.

How does this trend affect a company sitting in Vietnam? Currently, India is the undisputed leader of offshore services with greater than 80% of the market. However, it is expected that the Indian labor pool will not keep pace with the expected spike in international demand. While estimates range depending on the reported source, the trend is clear. By 2005, the Indian labor pool will approximate 700,000 professionals, but demand for offshore IT professionals will number greater than one million. Therefore, as supply falls short of demand, wage rates in India are expected to rise. Already, Vietnam provides a lower cost alternative to India and as the wage rate differential increases over the next few years, companies will increasingly be seeking alternatives for their offshore outsourcing.

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Demand for outsourcing professionals and primary source of supply					
	2001	2002	2003	2004	2005
Global Demand	145	360	635	850	1,065
India Supply	440	522	582	645	710

(Numbers have been rounded and are in thousands)

Recently the World Bank released a report assessing ICT development in Vietnam and indicated that Vietnam will “never achieve superpower status” with regard to software development. Given the magnitude of differences between Vietnam and a country such as India and to a lesser extent China, this point should be obvious. However, in light of the global expansion of the market, there is room for companies from many countries to participate. Although Vietnam may present itself now as an alternative to India, customers indicate that its long run competition given wage rate structures and global visibility will come from countries such as Russia, Malaysia, and the Philippines.

To illustrate the importance that buyers place on cost, consider the factors that buyers use in their decision making process for selection of offshore providers.

What Criteria Do You Use When You Choose Offshore Software Providers?¹

Cost 55%
Technical capability 45%
Quality 30%
Reputation 25%
Expertise 20%
Speed 15%

(Note: Multiple responses accepted from surveyed companies.)

We shall take a closer look at how Vietnam fares in each main category.

Cost: With cost considerations figuring so high in the decision making process and underemployment being so prevalent in Vietnam, we can only expect that international contract opportunities for Vietnamese companies will continue to grow into the future. Already, Vietnam is being utilized as an overseas development center (ODC) for many Fortune 500 companies and this trend will increase as these companies expand their offshore outsourcing budgets, look to mitigate global risks (e.g. potential India and Pakistan conflicts), and seek lower cost alternatives to India.

Technical capability: Vietnamese software engineers have been rated on par with their counterparts in other countries for technical aptitude. However, Vietnamese engineers are better known application development, maintenance and testing rather than for skills in areas such as design.

¹ Forrester Research, 2001 (Multiple responses were accepted from surveyed companies).

Quality: Quality is more often associated with process and managerial measures rather than pure technical output. To date, Vietnamese companies do not have the same reputation for quality as their counterparts in other countries. Certification for CMM and ISO are quality indicators usually sought by foreign customers and will be discussed later in this report.

Reputation: In terms of reputation for offshore software development, Vietnam is relatively unheard of in overseas markets. Recently published IT reports by groups like Research Vietnam, increased interest by the Western media, and some mention by investment analysts gave Vietnam some initial visibility during 2002.

CASE: Vietnam as an alternative to India. While there is anecdotal evidence of Vietnamese companies receiving increased attention as an alternative supplier to India (UBS Warburg Analyst Report, Aberdeen Global Outsourcing Best Practices report) there are also concrete examples of success. TMA Solutions recently beat two Indian companies in head-head competition for a contract with US technology company Critical Path. Such contracts may foreshadow more to come.

Defining the sector: Software Services vs Software Products

How should the company focus its development efforts?

A second key issues facing every software company is whether or not to develop software products or services. The set of skills required to manage and market software services are far different than those of a software product company. A services company reacts to the customized requirements of a client while a product company must define and defend a niche, package integrated bundles of value points, capabilities, and features, build a brand, develop marketing channels, and provide after sales service. The latter requires a more complex skills set, far more investment, and is beyond the capability of most young companies.

For software companies considering entry into the international market, there are very few examples of successful product oriented companies, while there are numerous successful cases of service oriented companies. The software industry in India has followed the services oriented model toward development.

Companies entering the software market often begin by competing on a competitive wage structure. This allows them to sell services that focus on low-end life cycle activities such as code writing, testing and maintenance. As the company develops deep domain expertise, it may move up the product lifecycle to design, specification and requirements setting. At this stage, some firms utilize personnel certification, increased organizational capability, and a satisfied customer base to evolve from providing pure software services to rolling out niche products in the domain expertise of the company. If successful, the enterprise will learn to control competitors and to discourage new entrants by setting industry standards in the domain area of expertise, by rolling out products on a product line basis, and by packaging integrated bundles of value points, capabilities, and features.

For the individual company in Vietnam considering whether to focus on developing products or services, key distinguishing characteristics and requirements include the following:

Software Products – characteristics of requirements for developing software products

1. Intellectual Property (IP) filing, protection, and enforcement so company can recoup investment into product
2. Must be close to customer to determine exact nature of demand and be capable of generalizing that need to larger market
3. Investment required for sales and marketing, to build branding, and to communicate the benefits of the product
4. Investment required to support after sales service of product

Software Services – characteristics of requirements for developing software services

1. IP owned by client
2. Specifications are set by the client
3. Customers are more proactive in seeking suppliers
4. Services delivered on contract basis

CASE: Against the odds. Although the investment and resources required to sell software products internationally are high, there are some examples of Vietnamese companies accomplishing that goal but on a limited scale. Paragon Solutions Vietnam (PSV), subsidiary to the US company Paragon Solutions, has developed SoftSim, an e-Learning simulation tool which has received awards and recognition in the US for technology innovation and excellence. Customers are in the U.S. The Dolsoft Company, a Vietnamese developer of GIS software and database visualization tools, has been successfully selling shrink-wrapped software products into the European market for many years and has recently broken into the US market.

Analysis summary for the firm

- Individual companies evaluating their options must be conscious of the different challenges associated with development of software products and services and between targeting the domestic and international market
- An opportunity target matrix to outline the relative difficulty associated with each strategy is below:

Opportunity target matrix for Vietnamese software companies			
Potential returns ↑		Software Services	Software Products
Resources required	International market	Medium	Most difficult
Complexity level	Domestic market	Least difficult	Medium
Resources required ⇒ Potential returns			

Strategies for the firm

Individually, firms can benefit by conducting their own SWOT analysis – that is, assessing the Strengths, Weaknesses, Opportunities and Threats (SWOT) they face in growing their company and in determining where they intend to compete (e.g. international or domestic, services or products). Once assessed, a firm must decide to compete on price or innovation. In other words, by offering similar products or services to their competitors at a lower rate or by offering unique products or services for which there is no competition. In the near term, Vietnamese firms competing in the domestic market must decide upon a price/innovation strategy but Vietnamese firms looking to the international market will be competing primarily on price.

For firms attempting to lower the sales and marketing barrier but not willing to make the required investment for an overseas presence, paid marketing “aggregators” can serve several clients simultaneously in the target market (thus lowering the cost for each individual firm) and are an option assuming no conflicts of interest between the aggregator’s various clients. Other companies in Vietnam have pursued a “something-for-nothing” approach in which they work with a sales agent in the target country who takes a commission only on successful sales. Such arrangements give the Vietnamese firm less accountability over marketing efforts in the target country.

Marketing partnerships and alliances are possible between Vietnamese firms and other offshore software provider firms from higher wage countries (such as India and to a lesser extent Thailand) as companies in those countries may seek their own cost cutting measures or access to talent to maintain client accounts. However, given the prevalent nature of proven on-site/offshore delivery models in software outsourcing, it’s unlikely that such alliances can be distributed or formed from afar. Rather, they will require close integration and will likely require project management and team leaders to be resident full time in Vietnam.

To look at the trend in regional alliances, consider the following: Five of the top six Indian firms are listed on the NYSE or NASDAQ and control more than half of the Indian outsourcing market. Many of these same firms (TCS, Infosys, Satyam, PCS and NIIT) are in the process of setting up a token presence in China to both tap that market and explore how it can be leveraged as an offshore base for Japanese and North Asian clients. Possibly in recognition of global risk concerns, companies such as Mascot and Satyam, have been asked by major North American clients to outsource 20% of their offshore work outside of India. Therefore, it is likely that these very same companies will come to Vietnam to invest, acquire, or partner with local companies in order to tap local talent as wage rate pressures increase in India.

The value of industry clusters

Numerous developing countries and regions strive to be the next Bangalore India or Silicon Valley USA. Yet studies reveal that most are falling short of their intended targets. The reason is that IT development initiatives focus on comparative advantages,

such as low labor cost and attractive tax incentives without developing long term sustainable competitive advantage. A region's competitive advantage is largely determined by two interrelated factors:

- 1) The collaboration between IT companies, financial and insurance institutions, university or vocational educational centers, government policies and regulations, business and professional associations, and oversees marketing efforts towards a common strategic vision.
- 2) The region's ability to differentiate itself from its competitors.

This is best accomplished by a clustering approach with a common strategic vision based on that area's uniqueness. Clusters offer the following advantages.

- Increased productivity and innovation
- Better access to skilled employees and capable suppliers
- Improved brand imaging
- Access to specialized information
- One stop shopping for international customers
- Access to institutions and public goods
- Increased leverage over government policy
- Improved access to global distribution

Building and facilitating cluster development is an option that the Vietnam software cluster can consider to help develop a common strategic objective and to overcome obstacles to competitiveness.

The Capability Maturity Model (CMM)

Raising the standard and benchmarking with peers around the world

Collectively, firms can improve the competitive landscape and Vietnam's chance to compete globally by jointly embracing and pursuing internationally accepted standards such as ISO and the CMM. Process improvement measures and mechanisms have become an increasingly important part of the software development process to ensure that quality meets global standards and that the industry is recognized for its capabilities and achievements. As international clients make decisions about where to outsource, these global standards are prerequisite to participating in the market.

Many clients, especially those with years of experience in offshore outsourcing, have come to view CMM or ISO 9000 as a given, a minimum entry for any prospective supplier.

-- Aberdeen Research, September 2002

The Capability Maturity Model (CMM) for Software was advanced by the Software Engineering Institute (SEI) of Carnegie Mellon University, has wide international support and is a publicly sponsored program free to any company that wants to adopt it. The

Capability Maturity Model describes the principles and practices underlying software process maturity and is intended to help software organizations improve the maturity of their software processes in terms of an evolutionary path from ad hoc, chaotic processes to mature, disciplined software processes.

By implementing CMM companies reap many tangible benefits, reduce software development risk and increase predictability -- thus becoming a more attractive partner or supplier to customers from around the world. However, CMM does not come cost-free. Considerable company resources must be dedicated to addressing key process areas necessary to climb the CMM certification ladder. CMM outlines a series of levels to indicate achieved "maturity" with level 1 as the least mature and level 5 as the most mature. Recently, SEI has forwarded CMMi, a successor model to CMM and companies are beginning to explore use of this model as well.

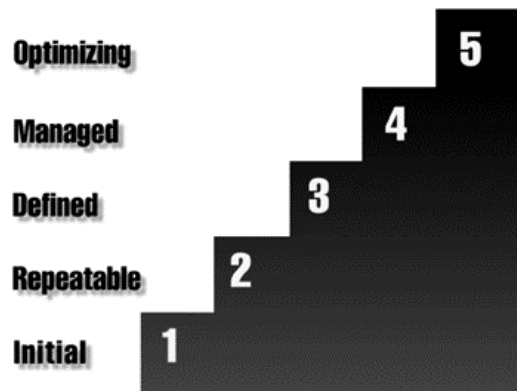


Figure 1: Capability Maturity Model - Levels for Software Development

CMM further explained

Except for Level 1, each maturity level is decomposed into several key process areas that indicate the areas an organization should focus on to improve its software process.

The key process areas at Level 2 focus on the software project's concerns related to establishing basic project management controls. They are Requirements Management, Software Project Planning, Software Project Tracking and Oversight, Software Subcontract Management, Software Quality Assurance, and Software Configuration Management.

The key process areas at Level 3 address both project and organizational issues, as the organization establishes an infrastructure that institutionalizes effective software engineering and management processes across all projects. They are Organization Process Focus, Organization Process Definition, Training Program, Integrated Software Management, Software Product Engineering, Intergroup Coordination, and Peer Reviews.

The key process areas at Level 4 focus on establishing a quantitative understanding of both the software process and the software work products being built. They are Quantitative Process Management and Software Quality Management.

The key process areas at Level 5 cover the issues that both the organization and the projects must address to implement continual, measurable software process improvement. They are Defect Prevention, Technology Change Management, and Process Change Management.

Each key process area is described in terms of the key practices that contribute to satisfying its goals. The key practices describe the infrastructure and activities that contribute most to the effective implementation and institutionalization of the key process area.

Characteristics of the 5 levels of CMM maturity:

- 1) Initial. The software process is characterized as ad hoc, and occasionally even chaotic. Few processes are defined, and success depends on individual effort and heroics.
- 2) Repeatable. Basic project management processes are established to track cost, schedule, and functionality. The necessary process discipline is in place to repeat earlier successes on projects with similar applications.
- 3) Defined. The software process for both management and engineering activities is documented, standardized, and integrated into a standard software process for the organization. All projects use an approved, tailored version of the organization's standard software process for developing and maintaining software.
- 4) Managed. Detailed measures of the software process and product quality are collected. Both the software process and products are quantitatively understood and controlled.
- 5) Optimizing. Continuous process improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies.

In many ways, the state of the Vietnamese software industry today parallels the state of the manufacturing industry in Japan following World War II. In July of 1950, the Union of Japanese Scientists and Engineers (JUSE) invited Dr. W. Edwards Deming to Japan to provide a series of lectures and seminars during which he taught the basic principles of quality control to executives, managers and engineers of Japanese industries. His teachings made a deep impression on the participants' minds and provided great impetus in implementing quality control in Japan. While in 1950s and 1960s, manufactured products from Japan were initially seen as low quality and inferior, by the 1970s and 1980s, Japanese products were globally competitive and known for high standards of quality.

With a dedication to scholarship unmatched by many of its peer countries in the software industry, Vietnam could also become globally known as a quality producer of software if the same fervor that captured Japanese manufacturing with the teachings of Deming were to capture the Vietnamese software industry with the quality standards of CMM and ISO. Participation in Software Process Improvement Networks (SPIN) Chapters and close collaboration between industry participants to share knowledge on software process improvement best practices are friendly, non-competitive ways in which individual companies can raise the standards both within their companies and for the industry as a whole.

Strategy summary for firms

- Mechanisms are emerging to help firms overcome the initial investment hurdle of an international sales/marketing presence
- Collaboration in industry clusters may help firms overcome obstacles to competitiveness
- Collaboration between firms in process improvement, through programs such as CMM, may raise the competitiveness of the whole sector

PART II: ANALYSIS AND STRATEGY FOR GOVERNMENT AND POLICY MAKERS:

Analysis for government and policy makers

For government officials, policy makers, and other stakeholders seeking to support development of the sector, it's important that competitiveness promotion strategies are not contradictory to ICT development strategies for the country. Government can have a strong impact on shaping competitiveness of the sector by shaping factor conditions through, for example, training and infrastructure policies. Furthermore, government set regulatory standards, processes and procurement practices can have a great influence on domestic demand.

A PEST/STEP analysis for Vietnam in the Software Sector

As government officials, policy makers and other stakeholders evaluate how they can contribute to the sector's competitiveness, they must look beyond the challenges and key questions faced by individual firms and instead consider issues that affect all firms. One mechanism for making such an evaluation is through a "PEST" analysis. A PEST analysis is a country-specific analysis of quantitative and qualitative external macro-environment that affects all firms. "P.E.S.T." is an acronym for the Political, Economic, Social, and Technological factors.

These external factors are usually beyond the firm's control and often times present themselves as threats (hence the appropriate use of the term "pest.") For optimists, changes in the external environment may create new opportunities so the letters can be

re-arranged as a “STEP” analysis. Below is an analysis relevant for the software sector in Vietnam:

PEST/STEP Analysis for Vietnam in the Software Sector	
Political <i>Political stability</i> – highly stable (+) <i>Risk of military invasion</i> - low in contrast to countries such as India (+) <i>Legal framework for contract enforcement</i> – under development (n) <i>Intellectual property protection</i> – weakest in the world (-) <i>Favored trading partners</i> – ratification of BTA with US puts country in more favorable light with customers (n) <i>Taxation</i> - tax incentives favorable for software companies (+) <i>Wage legislation</i> – minimum wage far below the threshold of sector standards (+) <i>Regulations & tariffs</i> – communications costs are prohibitively expensive but improving (-) <i>Work week</i> – standard (n) <i>Employee benefits</i> – many left to discretion to employers (n) <i>Political support of the industry</i> – emerging as a favored sector (+)	Economic <i>Economic system</i> – pursuing integration with global system, improving (n) <i>Government intervention in the free market</i> - moving away from central planning, improving (n) <i>Exchange rate stability</i> – stable (n) <i>Efficiency of financial markets</i> – fledgling stock market, very little venture capital (-) <i>Infrastructure quality</i> – poor and bandwidth expensive, but improving (n) <i>Skill level of workforce</i> – technically strong, managerially weak (+ and -) <i>Labor costs</i> – low (+) <i>Economic growth rate</i> – high (+) <i>Unemployment rate</i> – underemployment high (n) <i>Comparative advantage as host country</i> - image problem among potential client companies and investors (-) <i>Interest and inflation rate</i> – stable (+)
Social <i>Demographics</i> – young population, eager to integrate with global economic community (e.g. English language skills highly popular among young) (+) <i>Educational aptitude</i> – literacy high, education highly valued in culture (+) <i>Educational opportunity</i> – poor, institutions not keeping pace with levels of demand nor type of training demanded at tertiary levels (-) <i>Entrepreneurial spirit</i> – high, profitable sectors see many new entrants (+) <i>Information sharing</i> - information guarded, not shared. Creates risk averse environment for decision making (-)	Technological <i>Recent technological developments</i> – Limited installed technology base so Vietnam has opportunity to leapfrog other countries (+) <i>Rate of technological diffusion</i> – Poor mechanisms for diffusing technology as well as information mean decisions must often be made in ignorance (-)
Key: (+) Positive (n) Neutral (-) Negative (relative to competing countries)	

The number of macro-environmental potential factors are virtually unlimited. In practice, individual firms cannot be expected to change these factors so they must prioritize and monitor those that most influence the industry. For government, policy makers, and other stakeholders, the challenge is to determine which of the factors can be addressed for the benefit of all firms participating in the industry.

While changing a (-) negative to a (+) positive in the PEST/STEP analysis might have profoundly positive benefits across many sectors and many industries in the Vietnamese economy, the action required to make the change may entail the participation of diverse decision makers and diverse interests. For example, reducing communication charges to international standards might require the input of VNPT, the Office of Government, the Finance Ministry and others; strengthening IP laws and enforcement, MOSTE and the Ministry of Justice; opening up tertiary education to additional providers, the Ministry of Education and the Ministry of Planning and Investment. The number of configurations of overlapping authorities required to address individual areas of competitiveness is as diverse as the macro-environmental factors affecting the sector. Ministries, agencies, and other stakeholders that cannot change macro-economic factors alone must first invest effort into consensus building exercises before meaningful change can follow.

Vietnam's position Vs. competing countries in the software sector

As identified in the earlier section of this report, the most compelling market opportunities are global and in the provision of software services. India is the leader but China is often raised as a potential up-and-coming competitor. In terms of scale, the following chart indicates the quantitative distinctions between these giants and Vietnam.

Vietnam compared to global leaders			
(2001 figures)	China	India	Vietnam
Software Exports	\$850 million	\$6,200 million	\$21 million
Domestic software sales	\$4,300 million	\$2,060 million	\$50 million *
Growth rate - domestic software sales	+ 55%	+ 31%	NA
Current IT Professionals	150,000	522,000	20,000 *
Demand for IT Professionals	350,000	400,000	Growing
IT Professionals Graduating Each Year	50,000	73,218	4,000
Number of Software Companies	6,000+	3,000+	300+
Note: China and India statistics from Far Eastern Economic Review, September 2002 * unofficial and estimated			

However, the differences in scale do not mean that Vietnam cannot compete in the outsourcing services market or cannot serve as an alternative to the undisputed leader, India. In discussions with multinational companies experienced in both China and India, there is a consistent theme. Although the Chinese talent pool is much larger than that of Vietnam and the Chinese firms are starting to aggressively pursue quality certification such as CMM, most MNCs see the rapid growth rate in domestic demand in the Chinese

market as absorbing most of the available talent and resources. In fact, Indian companies have been stepping up their efforts to place workers on site and set up operations in China to meet demand in the Chinese market. Although Chinese companies and Chinese government officials publicize their desire to become a major offshore software destination, China should not be considered head-head competition for global outsourcing software projects as wage rates in China are already higher than those in Vietnam, as China does not have the inherent advantages over Vietnam as India (e.g. natural fluency in English), and many firms utilizing China cite their stake in the Chinese domestic market as influencing their decision to develop software there.

When companies look to offshore software outsourcing alternatives to India or China, the most frequently mentioned countries are Ireland and Russia and to a lesser extent, countries in Eastern Europe, Malaysia, Mexico, and the Philippines.

Analysis summary for government/policy makers

- The PEST analysis helps identify areas where the Vietnam can make changes to improve its competitiveness
- Changing macro-economic factors may first require consensus building since overlapping authorities may be required to effect change on key factors
- Due to scale, Vietnam is not positioned to “dominate” the software outsourcing services market but is positioned to participate fully in this market

Strategy for government and policy makers

From a strategic perspective, the correct role of the state in the economy can be controversial. There are examples of successful intervention helping to boost economic development, but there are just as many counter-examples of the government interfering, distorting the market, and diverting resources away from where they are best used. The need for governments to “do something” must be matched by equivalent constraint not to do “too much.”

Because of lead times involved before the impact of government actions are felt, governments must anticipate and put in place ahead of time the infrastructure, institutions and policies needed for the next level of competition. However, moving too far ahead of firms' strategies and capabilities will not only deprive them of the types of inputs and supporting conditions they really need, but confuse and demoralize them. Therefore, a careful balance must always be sought.

State intervention in the software sector

Strategically, there are numerous types of state intervention which can affect the competitiveness of firms operating within its borders. Generically, these might include:

- Targeted loans
- Export incentives

- Import restrictions
- Government procurement
- Public ownership
- Tax breaks
- Investment subsidies
- R&D subsidies
- Funneling of international donor resources
- Human resource development

In the same way that the PEST/STEP analysis reveals that overlapping authority affects a country's ability to make factor changes, overlapping authority may also be responsible for these "tools" of state intervention. Therefore, a key challenge for responsible government/policy makers is to find the right match between the factors identified in the PEST/STEP analysis against the generic tools of state intervention.

Setting priorities – the big picture strategy

In the recently released World Bank ICT assessment for Vietnam, it stated that:

"Developing the ICT sector, especially software assembly and development, is useful in creating jobs, but can have relatively little useful spillover into the general society unless it is part of a larger development strategy."

It later went on to conclude that Vietnam should focus attention on:

- Developing the IT industry as an enabler of development in all sectors
- Developing the IT industry primarily for domestic consumption and secondarily for export

While the first recommendation can be mutually implemented with many other strategies, the second is a strategy of mutual exclusivity and may ignore the larger benefits of a successfully developed software export strategy in Vietnam.

One of the most debilitating and competitive disadvantages for Vietnam has been decades of relative isolation from the world economic community. Vietnam will only become competitive if it can increase its integrative capacity with the global economic community and there are few better sectors to lead such integration than software. In software development, response to client requirements are inherent in the work, international interaction is direct, and there is minimal interference by other domestic concerns. Therefore, in contrast to other sectors of the Vietnamese economy, the software export sector is well positioned to become successfully and rapidly integrated into the global economic system. The demonstration effect, as well as the impact of actual integration, could "pull" along other sectors as well.

If Vietnam implements explicit policy measures to primarily develop the IT and software for *domestic* consumption, potential negative consequences include:

Vietnam's emerging software industry:
Competitiveness, positioning, and strategy in a global market

- The industry will remain globally isolated
- Opportunity costs will be incurred by ignoring global market trends and drivers
- Vietnam's integrative capacity through an important sector could be lost (project management skills, quality assurance skills, English language skills, other skills essential to participate in the global economy de-emphasized)
- Companies successful at domestic procurement will not have the skills required to sell internationally

However, the World Bank report does highlight the fact that the industry can be developed and for government and policy makers seeking to exert influence, strategic use of government procurement may be a tool immediately available.

Creating a domestic market that logically connects to global trends

Open source and free software as a strategic alternative

The software products found in the Vietnamese market mirror those found in many countries in the world. BEA application servers, Oracle databases, and Windows operating systems are found running on servers and PCs throughout the country. The key distinction between the installed software base in Vietnam and that of most other countries in the world is the fact that most software in Vietnam is pirated. In fact, Vietnam has the dubious "honor" of winning the world's worst offender award year after year.

The 10 countries with the highest piracy rates are (in rank order):		
	2000	2001
Vietnam	97%	94%
China	94%	92%
Indonesia	89%	88%
Ukraine/Other CIS	89%	87%
Russia	88%	87%
Pakistan	83%	83%
Lebanon	83%	79%
Qatar	81%	78%
Nicaragua	78%	78%
Bolivia	81%	77%
Source: Business Software Alliance's (BSA) seventh annual benchmark survey on global software piracy.		

For a country trying to attract high tech investment, foster a domestic market, and create an image that will attract offshore outsourcing clients, the "top" ranking designation is extremely harmful. Such rankings lead to damaging headlines in worldwide news journals and highlight Vietnam's problem (e.g. Headline: "Pirate's heaven in Vietnam" Article: Business 2.0, February 18, 2002).

Critics of these reports point out that software companies often fail to offer differentiated pricing structures for lower income countries. Given such wide disparity in GDP income levels and differences in purchasing power, it is understandable – and some argue acceptable – that piracy is so rampant in a country such as Vietnam. Consider the retail purchase price of standard Windows XP operating system and office suite and compare that to per capita GDP for an individual in Vietnam. The cost of Windows XP is 127% per capita GDP! A per capita price equivalent for someone in the US wanting to purchase such software would set the price at US\$38,436.

Cost equivalent of software based on country GDP*					
	Approximate Cost (Retail May 2002)	Cost as % of Vietnam GDP p.c. (\$440/year)	Cost as % of US GDP p.c. (\$30,200/year)	Price-equivalent for Vietnam in absolute terms	Price-equivalent for Vietnam in % of GDP p.c.
Windows XP OS+OP Standard	\$560	127%	2%	\$38,436	\$8
Windows XP OS+OP Professional	\$800	182%	3%	\$54,909	\$12
Note: GDP p.c.= Gross Domestic Product per capita					
*Adapted from Jordi Carrasco-Munoz, Economic Advisor for European Commission's Delegation to Vietnam, from article at Linux.com					

Others may justify piracy on moral grounds by pointing out that the net worth of Microsoft's chairman is greater than *one year of gross domestic product for the whole country of Vietnam*. Such approaches and arguments are counterproductive at a time when Vietnam is trying to integrate with the global economic system. Adopting international norms and standards are necessary to Vietnam's success so it is critical that Vietnam work toward IPR regulations and enforcement. Positive steps have been taken with the drafting of intellectual property laws (with WIPO - World Intellectual Property Organization assistance). However, even after appropriate laws are on the books, enforcement -- which can be costly -- will be required. Therefore, Vietnam should consider creative strategies to achieve its integration goals without losing access to important software technologies.

Open source and free software

The open source and free software movements are supported by leading multinationals including IBM, Sun Microsystems, and Hewlett-Packard, are gaining worldwide momentum from developer communities, and could have a profoundly positive impact on Vietnam. By embracing open source and free software and encouraging local adoption through government procurement and other mechanisms, Vietnam could accomplish many objectives:

- Remain compliant with intellectual property regulation and international standards

Vietnam's emerging software industry:
Competitiveness, positioning, and strategy in a global market

- Reduce the cost of software used in government offices, government companies, and the educational system
- Create demand for a local industry which connects Vietnam to global trends
- Create a reputation and “brand” for which Vietnam could become recognized

What is open source? “Open Source” software can be very complex notion but a simplistic explanation is that the open source embodies the principle where source code is freely distributed and accessible to various types of re-use and modification. Various licensing schemes determine the level of freedom upon which the code can be used.

The table below gives a comparison of open source licensing practices:

License	Can be mixed with non-free software	Modifications can be taken private and not returned to you	Can be re-licensed by anyone	Contains special privileges for the original copyright holder over your modifications
GPL	No	No	No	No
LGPL	Yes	No	No	No
BSD	Yes	Yes	No	No
NPL	Yes	Yes	No	Yes
MPL	Yes	Yes	No	No
Public Domain	Yes	Yes	Yes	No

For most core computer applications available on the market today, there is a free or open source equivalent which can meet similar needs. The table below shows proprietary software applications and the open source alternatives.

CATEGORY	Proprietary software	Open source alternative	NOTES
Application Server	BEA WebLogic	Tomcat, Zope	WebLogic is the standard -- but it's not free.
Database Server	Microsoft SQL Server	MySQL, PostgreSQL	MySQL is ideal for a smaller company on a budget, though Microsoft SQL Server is a formidable product.
Drawing Tool	Adobe Illustrator	GIMP (GNU Image Manipulation Program)	Illustrator is the standard in the graphic arts industry, but it's pricey.
E-Mail Server	Microsoft Exchange	Exim, Sendmail	Experts only: Sendmail is hard to configure (though a commercial version is also available).
File Sharing	Napster	Gnucleus	Freely distributed file-sharing software creates a recording industry nightmare: There's no one to sue.
Instant Messenger	AIM	Jabber	Jabber allows you to exchange instant messages via publicly available servers, or you can create your own private IM network.
Operating Systems	Windows	Linux and BSD	Linux and BSD can do more work with less hardware but user interfaces are more difficult for novices so more experienced

Vietnam's emerging software industry:
Competitiveness, positioning, and strategy in a global market

			systems administrators might be required
Productivity Software	Microsoft Office	OpenOffice	MS Office is not cheap -- but it has a huge installed base and millions of users already familiar with it.
Spreadsheet	Microsoft Excel	Gnumeric	Excel has all the features you need, but you have to pay for them.
Web Browser	Microsoft Internet Explorer	Mozilla	The Netscape-inspired Mozilla project has finally released version 1.0.
Web Server	Microsoft IIS	Apache	Apache is the most popular Web server out there.
Source: Adapted from Business 2.0 – August 2002			

Given the plethora of choices, widespread deployment of open source software does not limit capability in the sector but instead provides important benefits for Vietnam.

Open source provides costs savings

The potential cost savings of deploying open source software are significant as examples illustrate. Consider the following: many email and server functions for an office of 25 people could be supported by a low-end server (Intel Pentium III processor and 128MB of memory) and the cost of the server with associated software looks like this:

No operating system ~ about **\$2,400**

With Red Hat Linux ~ about **\$2,600**

With Windows 2000 Advanced Server ~ about **\$5,600**

Consider the cost of Microsoft XP + Office (US\$500+) against the cost of OpenOffice (free). Imagine the cost involved if every PC in the Vietnamese educational system had a licensed copy of Windows Office – such costs would be prohibitive. There are alternatives. An initial version of Open Office has been localized by one Vietnamese company and there is a small but growing contingent of programmers that are working on localization of other open source software products.

In addition to the raw cost savings on software, open source operating systems and programs can operate on simpler hardware platforms thus reducing the bill for the type of hardware required to run such applications.

Acting locally but thinking globally in creation of the domestic market

Government and policy makers could encourage the adoption and demand for open source and free software through strategic inclusion as part of government procurement practices. Deployment of open source software moves the costs associated with maintenance and upgrading of software away from procurement of bundled and proprietary releases and toward skill intensive activities likely to come from local input – thus increasing market demand for systems integrations specialists and application developers – *but not at the cost of isolating these IT specialists and software developers from their international peers.*

Open source software is developed collaboratively and often through de-centralized mechanisms by software engineers all over the world, so participation in this movement will give Vietnamese developers the chance to highlight their skills with peers from around the globe.

Finally, as Vietnamese developers become increasingly known for domain level expertise on open source applications, there could be increased interest by MNCs to utilize Vietnam as a source of offshore software development and services contracts for projects with open source components. As noted in the previous section “technical capability” ranks highly in the buyer’s selection process.

Create a positive reputation and “brand” for which Vietnam could become recognized

Vietnam is currently known among the worldwide software community as the worst IPR offender in terms of software piracy. Vietnam has an opportunity to turn the spotlight of negative attention into positive press.

The small country of Peru made international headlines when it announced that all public IT procurements would require free and open source software applications. Although leaders in the open source movement have cautioned against legislating technical specifications, much attention has been focused on Peru for their willingness to pursue such a strategy. A carefully crafted public relations campaign for the Vietnamese software sector combined with widespread adoption of progressive policies on open source could quickly shift the focus of attention on Vietnam away from piracy and onto the positive role that Vietnam might play in the worldwide open source movement.

CASE: Peru’s bold moves: In November 2001, a Bill (Number 1609) was presented before the Peruvian Congress by Peruvian Congressman Dr. Edgar David Villanueva Nuñez. In summary, this Bill states that all areas of the Peruvian government would be required to make use of open source software (with the term strictly defined within the bill) except in cases where a mature enough open source project is not available. The Bill only affects the government's systems and does not restrict commercial entities from participating, as long as the software they offer is open source--or for educational institutions that may require some particular proprietary software for research or other purposes.

Strategy summary for government/policy makers

- The states has numerous tools at its disposal to affect the competitiveness of firms in the software sector
- Vietnam must be careful to set the correct priorities and developing the software sector for export could have lasting benefits
- Widespread adoption of Open source and free software could have profoundly positive benefits for Vietnam

CONCLUSION

Modern day business theorists and practitioners advance the concept that a nation's wealth is principally of its own collective choosing. How a nation and its citizens choose to organize and manage the economy, the institutions they put in place and the types of investments they individually and collectively choose to make will determine national prosperity.

The software sector is important for Vietnam's prosperity and development and the challenges facing the software sector in Vietnam are similar to those facing the sectors of many industries in Vietnam. As Vietnam continues the process of integration into the global economic community, companies must learn to compete against companies located in other countries. In contrast to mature sectors with slower growth rates, the global software sector continues to grow rapidly and presents unique opportunities for Vietnam.

The industry has both competitive and comparative advantages over other countries. Through careful development and positioning of the software sector, the software industry can make strategic choices now which will set the stage for Vietnam's competitiveness for generations to come. Some of the most compelling opportunities for Vietnam will surface in four to five years time so industry stakeholders should anticipate these opportunities and work both individually and collectively, under a common vision, to realize these opportunities for the benefit for all.

About the organizations that provided this report:

Access America Trade Service (AxamTrade): AxamTrade provides sales, marketing, and management expertise to emerging global companies in their quest to bring quality products and services to new markets, to expand existing sales and distribution, and to manage relationships with customers.

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The Kenan Institute Asia: KIASia strives to be an institute of excellence that brings together the resources and skills of the private sector, governments, and universities to promote sustainable partnerships in Asia for economic development. KIASia provides knowledge, expertise, experience, information, and understanding in all its activities. It does this not through top-down or donor-recipient relationships but through partnerships that are valuable to all involved.

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